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ABSTRACT

A study examined adaptations made prior to or during the adoption of the Training and Visit (T&V) extension system. This system was developed in Turkey, based on the Israeli experience of the developer, and was further refined in India. It was later adopted by many countries in Southeast Asia, Africa, and other parts of the world. Experience showed the necessity to adapt the system to the very different sociocultural and agroeconomic conditions of the adopting countries. Examination of the revisions of the T&V guidelines showed that T&V had clear basic principles, but these had to be adapted to each existing situation. Most adaptations were made in relation to five basic T&V guidelines and key features: (1) extension exclusively (professionalism); (2) linkages with research; (3) regular and continuous training; (4) time-bound work (systematic visits); and (5) imitable contact farmers (field and farmer orientation). The case studies showed that adaptations were not only possible, they were necessary. Development of an adaptation instrument was suggested to help less experienced, potential T&V adaptors to make the needed alterations. (Contains 61 references.) (YLB)

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ADAPTATION OF THE TRAINING AND VISIT EXTENSION SYSTEM TO CHANGING SOCIO-CULTURAL AND AGRO-ECOLOGICAL CONDITIONS

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Adaptation of the Training and Visit Extension System To Changing Socio-Cultural and Agro-Ecological Conditions

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ABSTRACT

The Training and Visit (T&V) extension system was developed in Turkey, based on the Israeli experience of the developer, and was further refined in India. It was later adopted by many countries in South East Asia, Africa and other parts of the world. Experience showed the necessity to adapt the system to the very different socio-cultural and agro-economical conditions of the adopting countries. A number of these adaptations from a wide array of countries are discussed. In many cases useful, adaptive solutions were found, but in others the T&V system was adopted without the necessary adaptations. It is suggested to develop an adaptation checklist which will help especially less experienced, potential T&V adaptors to make the needed alterations.

The development of the T&V system-through adaptation based on experience

The Training and Visit (T&V) system of agricultural extension is today perhaps the most influential and most debated extension system in develop-

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ing countries. Strongly backed by the World Bank, it spread from its main place of development, in India, to the rest of South-East Asia and to dozens of countries in Asia, Africa and Latin America. Its development is interesting, because it is a typical case of adaptations of principles found to be useful in one country to changing socio-cultural and agro-ecologial situations in other countries.

The initiator of the T&V system, Daniel Benor, started his career as farmer and later as adviser in the Agricultural Extension Service in Israel and directed its activities between 1967-1974. During that time, the two principles which later gave the name to the Training and Visit system, were considered to be of basic importance to agricultural extension in Israel, yet in quite a different form from what we know today as T&V. (Blum, 1987). Extension workers' first task was to visit farmers in their fields, some four days a week, and to be in their regional office only during one day; yet the visits were not according to a fixed schedule. Extension workers were considered to be very dedicated, becoming more and more professionals. They had relatively good transport arrangements, and communication with the farmers, most of whom lived in cooperative villages, was quite easy—through the village secretariats. Informal feedback was efficient. Thus, no fixed dates for visits were needed.

A second basic principle of extension in Israel was (and still is) constant training for all ranks in the extension system. Extension workers are expected to devote a day per week (or even more) to their professional updating. However, this is usually not done in the form of regular one day training sessions, as in the T&V system. The relatively good professional background of extension workers makes it possible to use seminars, individual studies or conducting field trials as more individualized and more efficient methods of updating and even creating adapted knowledge by the extension workers themselves.

Some other T&V principles were considered important in the Israeli extension service, while Benor was working in it. The whole thrust was on agricultural topics only. Even home economics, an area which was emphasized during the 1950's in the new immigrant villages, was heavily curtailed. Youth work, community development and public health were taken care of by different organizations.

Contacts with research was traditionally close. Each major commodity or group of commodities has a Branch Directorate, in which farmers, extension workers and researchers decide how to distribute research funds. In the beginning, subject matter specialists supported non-specialized extension workers. Over time, all extension workers became specialists.

New technologies were tried out on small parts of farmers' fields and recommendations were based on the individual opportunities of different

farmers. Special attention was paid to a full separation between the advisory work of extension workers and statutory duties or commercial links. However, extension workers knew about facilities for credit, input supply and market problem, so that they could direct farmers to the relevant functionaries.

During the last years of the 1960s, Benor was the leading figure in the Seyhan Irrigation Development project in Turkey. It was agreed from the beginning, that extension must play a central part in the development effort. The first project reports e.g. (Seyhan, 1967) show that the basic proposals for the extension service were at that time quite similar to the Israeli extension system. Thus, local extension workers, called foremen, lived and worked during the whole week in one village. As usual, the developers brought with them ideas which had been successful at home. However, soon modifications were introduced, which later became integrated into the T&V system. These were:

1. Weekly meetings with 20 contact farmers (then called "cooperating farmers") in each village. These meetings, usually held in a coffee house, were not only attended by the village foreman (the local extension worker), but also by specialists. Specialists and foremen too met once a week, each group separately: the specialists to plan the next step, the foremen to be taught the new impact points.

2. An equal distribution of work among extension workers.

3. Concentration of the initial extension efforts on one crop—in this case cotton, and on specified impact points.

In 1974 Benor came to India, and there the T&V rationale was formalized (Benor & Harrison, 1977). Working now with a large scale system, the administrative and supervisory aspects had to be strengthened and the idea of a single command line and of a simple monotoring system were added. The principle of reaching the masses through contact farmers and procedures for their selection were refined. Because there was now a need to spread the system over large areas and to poor farmers, the strategy of beginning with inexpensive innovations which show within a short time good results became important.

The spreading of the T&V system

The T&V system was first introduced in the Rajasthan Canal Area and spread from 1974 onwards, first to Command Areas with intensive irri-

gation projects in Madhya Pradesh and Andhra Pradesh (Ghosal, 1983) and then to most Indian States and South East Asian countries. By 1978, the World Bank had T&V projects working in Indonesia, Nepal, Sri Lanka, Thailand, Bangladesh, Malaysia and Pakistan (Israel, 1982). A year later, also the Philippines introduced a modified T&V project.

After 1978, T&V projects were introduced to over 20 countries in Africa, to some countries in Latin America and even to some areas in Southern Europe (Blankenburg, 1984), all together into more than 40 countries (Benor & Baxter, 1984). During the last years the number of T&V and T&V-inspired projects continued to grow.

Not all these projects were "orthodox" T&V systems. Israel (1982) actually differentiates between.

—21 core projects, all in Asia, in which the T&V system was used with minor adaptations, under World Bank financing and monitoring;
—48 projects, half of them in Africa, which explicitly refer to T&V and were assisted by the World Bank;
—34 projects, 20 of them in Africa, which adopted some T&V principles, but not the system as a whole. 24 of these projects were co-financed by the World Bank.

While the World Bank is not officially committed to T&V, this extension system has received more Bank funding than any other specific extension approach. Some 45% of the Bank's extension funds have gone to 138 T&V or modified T&V projects in 45 countries (Hayward, 1987; Baxter *et al.* 1989).

As we saw, the T&V system itself was developed through a series of adaptations to changing needs. When it spread to different agro-ecological areas with different socio-cultural settings, more adaptations were needed and actually introduced (Blanckenburg, 1982, 1984; Russell, 1981). As Roberts (1986) points out, conditions prevailing in India at the time the T&V system was developed were in fact very favourable; irrigated crops were prevalent; the area was quite densly populated; infrastructures were relatively good; credit, input and marketing facilities were reasonably functioning: research results were available and extension reform was a priority item. Yet, already in an early stage, when the T&V system spread from one Indian State to another, adaptations were made (Howell, 1983, 1984). Thus, for instance, West Bengal abandoned the system of contact farmers in favour of one which serves all farmers who come to the meetings (Lahiri, 1983).

Israel (1987) points out that more systematic analyses of how to modify the basic structure of T&V to suit each application are needed. The potential for adaptations is great. The institutional principles of T&V have been adapted even for use in health extension (Havier, 1984).

While analyzing T&V project reports, some questions arose:

—How did the T&V guidelines change, over time, based on the experience in many countries?
—What were the adaptations made in different geographical areas?
—How far is a T&V adaptation still T&V?
—Were all the issues considered, when deciding on adaptationsr?

Method

The first question was relatively easy to investigate. The T&V system was clearly and concisely described by Benor & Harrison (1977). Their booklet had a very wide distribution and served as vade-mecum for T&V planners. Some years later, more detailed Operational Notes on the system's structure and function were developed by Benor and Baxter. These were tried out in different training seminars and were then put together into book form (Benor & Baxter, 1984). At the same time, the basic booklet was revised and republished (Benor, Harrison and Baxter, 1984). As first step, we compared the three documents and thus could deduct from the changes in content and style, how the initiators of the T&V system themselves were influenced by experience in the field.

Then, we collected reports from as many T&V projects as we could get hold of. We analyzed them in order to identify adaptations made prior to, or during the adoption process. We used for this purpose also earlier accounts (*e.g.* Israel, 1982; Blanckenburg, 1982, 1984; Cernea *et al.*, 1983, 1984; Howell, 1982, 1988) and other papers in which T&V adaptations were cited. The adaptations were put into categories, according to the principal features of the T&V system.

Changes in the T & V Guidelines

Benor & Harrison (1977) postulated 11 Basic Guidelines:

—Unified extension service.
—Extension exclusively.
—Systematic training and visits.
—Concentration of efforts.
—Imitable contact farmers.
—Linkages with research.

—Supply of agricultural inputs and credit through coordinated agencies only.

—Best use of available resources.

—Recommendations according to farmers' ability.

—Continuous improvement.

—Immediate success.

The first six guidelines are unique or at least very typical for the T&V system. Linkages with research are considered to be important also by other extension systems like FSR/E; but there the extension component is less dominant. Furthermore, the T&V system emphasizes the research-extension links at various levels, and follow-up publications (*e.g.* Cernea et al. 1983, 1984) show that this topic is of central importance to T&V implementers.

In the second group of guidelines are either corrolaries of other principles or strategies which are used also in other extension systems. If T&V is to concentrate on extension only, obviously some other agency has to look after the supply of inputs, credit and marketing facilities. Most extension systems would argue in favour of realistic recommendations and of continuous improvement. Benor & Baxter (1984) themselves seem to implicitly make this difference, because they do not include the second group of principles among the T&V Key Features.

In the revised edition of the T&V guidelines (Benor et al., 1984), the principle of starting with impact points which promise "immediate success" was taken out of the list of Basic Guidelines, but was kept as a tactical advice. While the first version was based on the relative short experience in India, the revised edition makes much use of examples from other countries, mainly in South East Asia, but also in Africa. Even the style has become more flexible, indicating that T&V has clear basic principles, but these have to be adapted to each existing situation.

This line was developed quite explicitly in the T&V "Manual" (Benor & Baxter, 1984) where the authors state: "The experience of many countries in implementing the T&V system has suggested areas where a change in emphasis, clarification, or adjustment is required." The authors mention two main lessons from the experience which have been particularly influential in producing their book. "One lesson is the continuing need to adapt any extension system, in this case the T&V system, to the agricultural and administrative structure of a country." The second "lesson" is a safety break on the first: "..while acknowledging the need for adjustment to local circumstances, it must be clear that the basic principles of the system must be well understood and that there is no room for significant variations in its basic features."

Two major questions arise: How far is an adaptation still within the framework of "The System" which is being adapted? And, more basically- how far are adaptators bound by any given system, or is their first allegiance to their own needs and philosophy, even if that means "transgressing" basic principles of an established extension system?

Of course, there is nothing sacrosanct about the T&V system as such. Its practitioners and proponents have actually made and sanctioned adaptations, according to felt needs and antecedent patterns, taking in account specific agro-ecologically and socio-culturally conditions. Furthermore, it is clearly understood, that the suitability of an extension system to a specific situation as seen by those who will in the end operate it and be responsible for its working, stands above the claim that a given extension system (T&V or other) will serve as panacea for an efficient flow of knowledge in all agricultural systems.

However, as any system has its boundaries (which are not always well defined), also T&V has its limits, namely its basic principles. No country or other unit which operates an extension system is obliged to adapt T&V or to call an extension system T&V, when it actually is no longer one. The reason to keep the name T&V also when one or more of its basic principles were abandoned in the adaptation process stems often from the assumption (right or wrong) that an extension system with the T&V label has better chances to receive World Bank support than a non-T&V system.

This leaves us with the question: how far is an adapted T&V system still true to the T&V spirit? Two criteria can help to answer this question in a given case; and both are not clear cut. (1) The essence (rather than the specific formulation) of the T&V guidelines and especially of the six T&V-specific ones should be well recognizable in the adapted version, and (2) the adaption should be more effective and efficient than the prototype, under the given conditions.

Instead of Basic Guidelines, the T&V Manual (Benor & Baxter, 1984) speaks of seven Key Features of the T&V system which "cannot be changed significantly without adversely affecting its operation". Table 1 juxtaposes these key features with those six parallel basic guidelines in Benor et al. (1984), which we termed "typical or unique for the T&V system".

While two of the principles (linkages with research and concentration of efforts) are also verbally identical with corresponding key features, and a third (systematic training and visits) was divided into two key features, three other basic principles were rephrased in the key features, probably to emphasize specific issues. In a "unified extension system" a single line

TABLE 1

Comparison between the T&V Basic Guidelines and Key Features

Basic Guidelines (Benor et al, 1984)	*Key Features (Benor & Baxter, 1984)*
Extension exclusively	Professionalism
Linkages with research	Linkages with research
Systematic training and visit	Time-bound work (and) regular and continuous training
Imitable contact farmers	Field and farmer orientation
Unified extension system	Single line of command
Concentration of effort	Concentration of efforts

of command is the central feature, "extension exclusively" is the basis for building up professionalism, and "imitable contact farmers" are a tactical device to ensure field and farmer orientation. Yet, the rephrasing of the latter two principles shows, that the authors prefer a wider and more adaptable approach, when it comes to training. Thus, contact farmers are considered not as a final goal, but rather as a means to ensure field and farmer orientation. Similarly, 'the typical ratio of 1:800 between field level workers and farmers is not one of the basic principles or features, but rather a means to make regular visits possible.

Adaptations Identified

We re-searched T&V and related project reports, as well as critical reviews of experiences with T&V projects. Most adaptations were made in relation to five basic T&V guidelines and key features: (1) extension exclusively (professionalism), (2) linkages with research, (3) regular and continuous training, (4) time-bound work (systematic visits), and (5) imitable contact farmers (field and farmer orientation). Adaptations of the five principles most typical for T&V will be discussed in the following sections.

The case studies show that adaptations are not only possible; they are necessary. However, as Israel (1987) writes: "If some of the central prerequisites are not in place or there is little likelihood for a long-term effort, T&V should not be introduced".

Professionalism (extension exclusively, in a unified extension system)

The rationale for a professional extension service which should not be involved in regulatory or non-agricultural activities and whose field workers

should not distribute inputs is based on two premises: These additional activities do not allow concentration on the main job-agricultural extension, and they easily turn the field worker into a petty government official who is not fully trusted by farmers. When he distributes inputs, his status rises, but often corruption enters the system.

The test is in the field. As Russell (1981) writes: "Ideally they (the Village Extension Workers) should concentrate on giving advice, provided other services are effective.., but for reasons of cost, institutional weaknesses and poor coodrination, this is not always feasible ...Without a supply and a marketing infrastructure, the credibility of the extension worker will soon be lost." Even in India, T&V field workers still pay an important role in input supply, where no effective supply system functions (Howell, 1988).

In the discussion about the reciprocal influence between extension and supply organisations there are two juxtaposed opinions. While Benor and Baxter (1977) assume that the provision of inputs, credits and market facilities will improve, once the extension system is well organized, others (*e.g.* Howell, 1982) suggest that extension can be only effective, when it is closely linked to the provision of inputs and credit. There is no doubt that the two have a synergistic effect, as shown for instance in the Minimum Package Program in Ethiopia (Russell, 1981). The question is: what to do, if prior to the introduction of a T&V system, the only functioning supply organization was in the hands of the organisation which also did extension work (and was understaffed)?

A typical case is the West Volta Agricultural Development Project (1978), where extension workers used to meet their clientele in the parastatal cotton company's store, because they also supplied the inputs. In this case, the solution was a stepwise shift from "mainly supply and little field extension" to "T&V and temporary input supply". Two days a week would be devoted to input supply, with a simultaneous effort to create village pre-cooperatives ("groupements villageois") and credit committees to take over these functions, so that in later years the extension worker could devote his full time to his main task (Edery & Levy, 1981).

Another temporary solution was found in Mali (Parker, as cited by Howell, 1985). Extension workers who formerly fulfilled both advisory and supply functions were divided, according to their abilities, into two groups, each of which specialized in one of the two functions.

In the Lafia Land Settlement Project in Nigeria, Village Extension Workers help to secure clearance certificates for land preparation and supplies, because there is no one else who could do that (Howell, 1982).

In the Philippines, where the extension system is termed "modified T&V" (Nagel, 1983), extension workers help farmers to receive credit.

Where is the limit to an adaptive approach to the "Extension Exclusively" principle of T&V, when the alternatives are either no T&V (and no effective extension) or making a compromise? It seems that three criteria have to be considered: (1) There is an absolute need for the additional function, and this cannot be fulfilled by another branch of government or private initiative, at least not at the time a T&V system is set up. (2) The additional task (*e.g.* help in securing credit, permits for land clearances) is a temporary one, until a suitable subsystem is established, which can do the job better. (3) The job is mainly a professional one, *e.g.* the extension worker has to assess, if the right conditions exist (*e.g.* for a local irrigation project) and he is better qualified to do this than any other functionary in the system.

Similarly, just because of their professional ability, extension workers in Maharashtra, India, helped to get large numbers of soil samples to the testing stations (Dorge, 1983)—a service performed also by many extension agents in industrialized countries.

Linkages with research

Rogers et al. (1976) have pointed out that a successful extension system is one which (among other conditions) grew parallel to the agricultural research system, and one was not grafted on the other at some later stage. This is clearly not the case in most developing countries. Therefore initiating compensatory actions to enhance the capability of the research system to produce relevant recommendations is a precondition for any successful T&V project. However, this in itself is not enough. The research and extension systems must be linked and coordinated—and that was not the case in most countries. To secure a better link, T&V blueprints include setting up of Joint Technical Committees at several levels and monthly workshop, where researchers, subject matter specialists (belonging to the extension system) and extensionists meet. Also, a network of farm field trials, supervised by research workers is recommended.

To strengthen the link, in the National Extension Project of Kenya, for instance, the post of a Provincial Research-Extension Coordinator was created and filled by a researcher (Zohar & Ochieng, 1985). A similar solution was found in Turkey, however, there the coordinator was recruited from among the extension staff (World Bank, 1983).

The more difficult question is: what to do, if the agricultural research system of the country is not satisfactory or not functioning at all? In fact, for many years there has been a tendency to refrain from recommending a T&V system in the absence of a reliable, agricultural research system, especially in Africa (Howell, 1984). In other cases, adaptive measures to initiate research-type activities by the extension system have been taken.

While it could be argued, that a T&V system which occupies itself with research is "transgressing" the principle of "extension exclusively", it is clear that both research and extension belong to a common knowledge system, and field workers are usually not involved in the research aspects. Some of these cases in which T&V projects took over some research functions, due to the lack of an effective research infrastructure, follow.

In Madagascar, the only rice research station is several hundred kilometers away from the T&V Highland Rice Project. Therefore, it was decided to create within the project a Research Support Unit, involving an expert to plan, conduct and supervise trials on selected locations in the project area and coordinate activities with the already existing FAO fertilizer program (Project Engrais Malagasy). Since both extension and research were under the same administrative and financial roof, the task was considerably eased (IFAD, 1983).

In Sierra Leone adaptive research was built into the Northern Integrated Area Development Project which was also in charge of extension, thus bringing research and extension under one umbrella (Russell, 1980).

Steele (as cited by Howell, 1985) reports about a project in Lesotho where regional field trials were introduced instead of research stations. Such solutions always arise questions about the reliability of the results, unless the field trials are properly planned with suitable replications, and those who closely supervise trial fields understand the imperimental methodology and the need to keep equal conditions in comparative plots. They also need the facilities (mainly for transport) and a suitable schedule to properly supervise the field trials. Usually, extension workers and farmers on whose fields the experiments are conducted, have not the necessary knowledge. Wrong execution of the trials or unjustified conclusions can lead to dangerous misinformation which will become even more harmful, when effectively spread by the extension system. No doubt, a farming system research approach can be most helpful, but this too necessitates the cooperation of competent researchers.

Regular and continuous training

Institutionalized, regular training of the field staff is a basic principle, anchored in the very name of the Training and Visit system. It is quite well established in all T&V projects, atleast for the training of field level workers. It should apply also to higher levels of the hierarchy, but in many cases this aspect is neglected, and wrongly so. According to the Indian blueprint of T&V, training is provided on a fortnightly and sometimes on a weekly schedule. Much depends on the preservice training of field workers, but even when this is good, regular training sessions are needed to provide efficient feedback.

Many countries (*e.g.* Kingdom of Thailand, 1983) have put their field workers through a pre-service orientation course, in which they were instructed how to deal with the T&V system. In Somalia, special training centers were set up for that purpose (Chapman, 1988).

Modifications to the original T&V system are mainly related to the intervals between training sessions, and this for several reasons:

(1) Because of sparse population, long distances (especially in Africa), bad roads and the need to pay per diem expenses, training sessions are sometimes held only once in four weeks.

(2) In other cases this is done because the organizers feel that the extensively grown rainfed crops, *e.g.* cotton in Burkina Faso, do not need the same intensity of training as in intensive, irrigated farming systems (Edery, 1982). Later, the four week cycle in Burkina Faso was shortened to three weeks (Levy & Kam, 1984), similar to the Lafia Project in Nigeria (Howell, 1982).

Russell (1980) criticized the monthly span between training sessions on the ground, that they do not effectively provide farmers with timely feedback on problems encountered in the field, for which the field level worker did not have a ready solution. Also, in rainfed crops there is more need to revise recommendations according to changing climatic conditions.

In some cases, especially when not enough subject matter specialists are available, training is handled by agricultural officers who are not specialists, but receive some training from subject matter specialists. In this indirect training the likelihood that messages become distorted increases because of the additional and not so reliable transmitter. Also the advantage of overlap in training both levels together are lost, and delays occur in passing the messages on to farmers, thus also slowing down feedback from the field (Russell, 1980, on the WADU project in Ethiopia). While the criticism is well taken, the adaptators who had to work under suboptimal conditions remained within the framework of "regular training".

The training cycle can be modified also during certain stages in the introduction of a T&V system, *e.g.* it can be weekly during the initiation period and later be given larger intervals, once field workers have become more professional. Where "dead seasons" occur due to climatic conditions, these should be taken in account, when planning the training schedule.

Time-bound work (systematic visits)

The second principle which gave the T&V system its name is that of systematic visits with farmers, as groups, and as much as possible in their fields. These visits must be made on a regular schedule which are well known in advance to farmers. Adherence to this principle also facilitates systematic monitoring and supervision of the field staff. When adaptations to the principle of regular (usually fortnightly) visits are made, a number of interrelated issues are taken into account: availability of staff, the ratio between them and farmers, the work load and mobility of field staff and media support available.

Staff deployment was a relatively easy task in the Indian context. Large numbers of secondary school graduates to fill field posts were available, as well as diploma and degree holders for supervisory jobs. The situation is quite different in Africa (Russell, 1980). To overcome this difficulty, Benor and Harrison (1977) suggested to plan nationwide, but to initially cover a smaller area and to work there intensively, under the assumption that once an impact has been made, support for basic training and for recruitment of more extension staff will follow.

Since women constitute the major part of the agricultural labor force in Africa, their employment as extension workers should be considered. This was done in the Kenyan project and in Swaziland (World Bank, 1984). Also in Somalia attempts were made to involve more women as extension workers and as contact farmers (Chapman, 1988). In the Comoro Islands, 20% of the field level workers are women (Roberts, 1984). Often, socio-cultural obstacles have to be overcome, when women are to be recruited into the extension service. Where they are more involved in all spheres of life, their integration into the extension system is easier to achieve. Thus, in the Philippines 76% of the Farm Management Technicians (equivalent to Village Extension Workers) are women (Nagel, 1983).

Another adaptation of the T&V system concerns the use of para-professionals. In Nepal, farmers preferred to learn from village workers drawn from their community than from more professionally trained agricultural assistants (Russell, 1983). However, Baxter et al. (1989) found that this did not work well. In Zimbabwe experienced contact farmers have been recruited as para-professionals who take part in fortnightly training sessions and serve as part-time village extension workers (Russell, quoted by Howell, 1983). The success of para-professional, as studied in the context of the USA (Rogers et al., 1976) and Taiwan (Lionberger and Chang, 1970) is due to an added trustworthiness of the para-professionals who are socio-culturally closer to the farmers than extension workers who belong to different social strata. (Rogers, 1983).

The "classical" ratio between field extension worker and farmers in T&V systems is 1:800, yet already in the T&V precursor Seyhan Irrigation Project (1972) in Turkey, and later in intensively irrigated areas in India that ratio was intensified to 1:250. In the renewed T&V project in Turkey the intensity of extension-farmer contact varies with the intensity of agricultural production. One field worker serves 250 farmers in irrigated areas and 550 farmers in dry farming areas (Erkus et al., 1984). Increasing the ratio is recommended, when both viable recommendations and candidates for recruitment are available (Russell, 1981), or when areas are unaccessible, as in Assam (Russell, 1983). On the other hand, in areas of extensive agriculture, or where not enough staff could be hired, the ratio was reduced. An extreme reduction of the ratio can be found in Ethiopia, where one field worker is expected to serve 1,700 farmers, visiting them on a monthly basis (Roberts, 1985). This ratio was decided upon, because the extension system was to be implemented nationwide, but budget restrictions did not allow for more staff to be hired.

Sometimes the ratio is changed over time, usually with the spreading out of the system after its initiation period. Thus, in Burkina Faso it was first 1:180 (Issak, 1981), but this was changed to 1:218 and even to 1:800 in more extensively cultivated areas (Howell, 1982).

The number of farmers whom a field level workers can meet depends on the density of the population, his mobility and the distance he has to travel to meet his clients. Weather and road conditions play an important role. The Village Extension Worker should live as close as possible to his clients. "When moving from Asian to African conditions, with their often scattered settlement patterns, the T&V system has to operate with more limited horizons" Pickering, 1981).

Like the training schedule, also the cycle of visits must be regular, but frequencies can change. The cycles of visits range from once a week, as in the Seyhan Irrigation Project (1972), to a three weeks cycle, *e.g.* in Burkina Faso (Levy & Kam, 1984) and even to monthly visits, *e.g.* in Ethiopia (Roberts, 1985). In Somalia the fortnightly cycle of visits was replaced by a monthly cycle, after the experience of the first three years had shown that the fortnightly cycle did not work for lack of transport and fuel and for lack of sufficiently detailed recommendations (Chapman, 1988). However, the most widespread schedule remains the fortnightly one.

In all these changes of ratio, work load and frequency of visits, the adaptations were quantitative, triggered by budget and manpower constraints but not countering the basic T&V principle of regular visits.

In Somalia, field level extension workers meet with contact farmer groups; but they are also expected to establish 48 demonstration plots —a goal which was not reached (Chapman, 1988).

In Bauchi State, Nigeria, the T&V system was changed to T&D—Training and Demonstration (China & Langmead, 1985). Instead of the visits to contact farmers' regular fields, the village extension worker sets up his own demonstration plot and helps up to eight farmers from different hamlets to set up their own 0.2 hectare mixed crop demonstration plot. Group activities are then organized around these plots. Mass media are used more intensively than in regular T&V projects.

The question of such a modification can still be considered to adhere to T&V principles depends on the regularity of farmers' meetings at the demonstration plots and if these are established on typical farmers' fields (and not only those of large farmers) and are handled with the same inputs most farmers can afford.

The use of mass media can help the field staff in their task. It is actually recommended by T&V planners (Benor et al., 1984) and was recommended by Roberts (1985) as cost-effective, partial replacement of visits. However, it cannot come instead of visits.

Imitable contact farmers (field and farmer orientation)

Innovations are spread from their origin to users in a multi-step flow pattern. In a large scale system like T&V there are at least four steps through which information must flow (and hopefully in both directions): from the researcher to the subject matter specialist, from this to field extension workers and then through contact farmers to the majority of the final users of this information. At all transmitter stations some of the information is lost or distorted.

While the first three steps—from research to SMS, to field staff and then to contact farmers can be monitored, the final and decisive step from the 10% contact farmers to the rest of them is outside the control of the T&V system. The contact farmer plays perhaps the most crucial role in the whole knowledge dissemination process. He does so in two ways: (1) by passive transmission, when non-contact farmers see what he does and eventually imitate him, and (2) actively, when he is asked to explain and promote the recommendations to neighbors and friends (Benor & Harrison, 1977).

Also outside the T&V system, farmers use mainly two sources of information in their decision making: (1) Extension workers or others who are considered professional authorities, and (2) peer farmers who had to solve a similar problem (Scoullar, 1978; Blum 1989). In the latter case, farmers go to "sociometric stars"—the ideal persons to be chosen as contact farmers.

We can observe a shift in the role attributed to contact farmers in the evolution of T&V extension. In the first version of its description (Benor and Harrison, 1977), the assumption was that "each farmer talks about the practices he has been taught." There seems to have been misunderstandings on the "active" role of contact farmers. This led in some cases to claims for part-time salaries as para-professionals. Therefore, Benor et al. (1984) emphasize the inherently passive character of the contact farmer: "While performing a key role in the extension system, the contact farmer does not hold a formal position. The contact farmer is not an extension agent. He (or she) should promote extension activities by adopting recommended practices and by explaining them to the interested farmers; but he is not expected to promote practices among farmers."

In some cases, contact farmers have become almost institutionalized links between farmers and suppliers of agricultural services. Thus, Howell (1982) cites a case in the Muda Project in Malaysia, in which contact farmers manage the irrigation system and the deployment of tractors, and another case, from Nigeria, where contact farmers assist in the distribution of inputs or act as chairmen of small farmer councils which sometimes arrange for the supply of fertilizers and improved seeds. In Zimbabwe farmer leaders have taken the place of contact farmers (World Bank, 1984). They are elected by farmer groups, attend regularly training sessions and then, on their return home instruct their respective groups (Sagar & Farrington, 1989). In all these cases there is nothing wrong, when local leaders who are trusted by their community fulfill additional functions to those of a (passive contact farmer, as long as they do not turn into "little extensionists" and expect a salary or gratuities for their advice. In Turkey and Nepal, contact farmers were paid to teach others. However, it seems that this did not work out well (Baxter et al., 1989).

The largest single issue related to contact farmers is that of their selection. Though Benor and Harrison (1977) write that contact farmers "should not be the community's most progressive farmers, who are usually regarded as exceptional and their neighbours tend not to follow them", Best (1980) argues that often the most wealthy and progressive farmers who also wield political and social influence are selected and receive preferential treatment by extension; but farmers cannot identify with them. Nagel (1983) reports that in the "modified" T&V project in the Philippines "93% of the contact leaders were recruited from the ranks of present or former officials in the bureaucracy,....four out of five contact farmers run a commercial animal production and enjoy a higher standard of living. The experience shows that contact leaders regard themselves as "leaders", but not necessarily contact leaders (or farmers) in the sense of T&V philosophy."

Even when contact farmers are not chosen by headmen or village elders, but are elected, *e.g.* panchayats in India (Lahiri, 1983), there is a possibility that other qualities than those of a good farmer who is willing to share his knowledge are taken into account. The problem is more severe, where competing clans live in the same community.

In some cases, *e.g.* in Thailand, contact farmers were chosen on the basis of sociometric measurements. This excellent but also costly and time consuming procedure is usually not feasible.

Another point of possible adaptation is whether contact farmers should be rotated or not. Benor et al. (1984) are of the opinion that a contact farmer should not be rotated or replaced, unless he does not show interest to carry on as such. However in several projects, *e.g.* in Haryana State, India (Hoeper, 1983) and in Italy (Ityel, 1978) rotation systems were adopted.

The work of the extension worker becomes more efficient, when one of the contact farmers serves as coordinator. This is the main task of the elected Kaset Muban (Kingdom of Thailand, 1983).

Especially in Africa, but not only there, the task of contact farmer was adapted from that of an individual to that of a group. Howell (1982) cites farmer committees in Botswana and group farms in the upper region of Ghana which have been established to try out the new recommendations. In the WADU project in Ethiopia, peasant associations were set up to avoid an otherwise unusually high ratio of field extension worker to contact farmers (Russell, 1980).

In Madagascar the clan-like pattern of settlement led to the idea of meeting farmers according to their residence, in hamlets, where groups of common kinship live and work (Relaivohitam, 1986). Similar traditions exist in francophone West Africa (Baxter, 1987). With effective farmers' groups and a system of *animation rurale*, the role of the extension worker will normally be more problem and site specific and also more interactive than in the absence of such groups (Morize, 1985). Groups learn together, *e.g.* in Burkina Faso (1989), where regular training of farmer groups is given in "field schools" and demonstration groups, at the village level.

Most of these collective arrangements have deep, social roots. The same is true for the farmers' groups in Indonesia, each of which irrigates some 25-30 hectares. The three tier social structure consists of the contact farmers or "formal leaders", the progressive farmers (also called informal leaders), and the other farmers as followers. This structure is rooted in the tradition of the water management associations. (Blanckenburg, 1982; Sukaryo, 1983).

Baxter (1987) points out that in any one location the extension agent must invariably use a mixture of group and individual approaches: meetings with farmers for general contact, work planning and feedback, and visits

to the fields of individual farmers (often in the company of other farmers) to examine specific conditions.

In other cultures, potential contact farmers are afraid that serving as contact farmer and having other farmers visiting his field might bring bad luck, because of the evil eye. In such a case, farmers will be reluctant to accept the position of contact farmer.

Conclusions

This study has shown that once an extension system, in our case T&V, is being transfered from one place to another, it must be adapted to the new agro-ecological and socio-cultural conditions. Otherwise, it is bound to fail. The early history of T&V is already one of adapting principles which its originator had used successfully under quite different circumstances at the challenge of creating an extension system which would be manageable under the large scale conditions of India. Clearly, many adaptations in all important points are needed, when one wants to transplant an extension system from one country to another, without loosing the managerial values imbedded in its principles. The meta-analysis of reports on T&V implementations showed that in many cases the need for specific adaptations was not foreseen, and these were made only to solve a problem which had arisen in the field.

Israel (1987) writes: "If Daniel Benoris around there is no problem because he knows how to do it—for example in heterogeneous, mountainous, rainfed conditions, which differ markedly from those in which the system was originally successful—but he cannot be around everywhere and forever". No extension system can depend on its original developer. As a matter of fact, also T&V was adapted successfully in many places, but in others adaptators tried to go too much "by the book". Potential adaptators can learn from the experience of others, who went through this process, more often than not, in quite a intuitive fashion. The collection of case studies and, even more, the development of an adaptation instrument should be helpful to teams working on the adaptation of T&V extension to their own situation.

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